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Crookes dark space, and finally the formation of cathode and X-rays. The phosphorescence due to the latter is strikingly shown by introducing into the bulb a few cubic centimeters of willemite flour (*W* in the figure). This should be well dusted over the inner surface of the bulb before sealing the apparatus to the pump. A particularly beautiful effect, at the cathode-ray stage, is to disconnect the pump and then shake the bulb vigorously so as to throw the flour through space while the discharge is passing.

Pressure in Mm. Hg	Induction Coil Discharge	Minimum D.C. in Volts Required to Glow Tube	Maximum D.C. Available Was 1,000 Volts	Remarks
2.0	Passed freely.	480	The discharge in each case was more volumi- nous than with the induction coil.	Blue at cathode.
1.5	More freely.	440		" " "
.5	Still more freely.	360		" " "
.08	Same.	360		Willemite began to phosphoresce.
.01	Less freely.	500	Discharges same as induction coil.	Willemite a beautiful green.
.006	Still less freely.	560	Less than in- duction coil.	Weaker.
.005	Small.	680	Much less than induction coil.	Still weaker.
.004	Faint.	—	No discharge.	Ceased to phos- phoresce.
.003	None.	—	—	—

It may be of interest to add that the tube works well on direct current of fairly low voltage. For that purpose ordinary high potential storage cells (of capacity one tenth ampere normal discharge rate) may be employed. To guard against too great a current flowing through the discharge tube an adjustable water resistance should be included in the storage-battery discharge circuit. The effect upon the ease with which the storage battery discharge passes through the tube may be nicely shown by first ionizing the remaining gases in the tube by means of the high potential induction coil discharge, and then switching instantly to the storage cells. The

minimum direct-current voltage that will, for a given pressure, produce a discharge may thus be obtained. This minimum voltage together with other data and remarks are given in the accompanying table.

CHAS. T. KNIPP

LABORATORY OF PHYSICS,  
UNIVERSITY OF ILLINOIS

#### THE CONVOCATION WEEK MEETINGS OF SCIENTIFIC SOCIETIES

THE American Association for the Advancement of Science and the national scientific societies named below will meet at Cleveland, Ohio, during convocation week, beginning on December 30, 1912.

*American Association for the Advancement of Science.*—President, Professor Edward C. Pickering, Harvard College Observatory; retiring president, Professor Charles E. Bessey, University of Nebraska; permanent secretary, Dr. L. O. Howard, Smithsonian Institution, Washington, D. C.; general secretary, Professor H. E. Summers, State College, Ames, Ia.; secretary of the council, Professor H. W. Springsteen, Western Reserve University, Cleveland, Ohio.

*Section A—Mathematics and Astronomy.*—Vice-president, Professor E. B. Van Vleck, University of Wisconsin; secretary, Professor George A. Miller, University of Illinois, Urbana, Ill.

*Section B—Physics.*—Vice-president, Professor Arthur Gordon Webster, Clark University; secretary, Dr. W. J. Humphreys, Mount Weather, Va.

*Section C—Chemistry.*—Vice-president, Professor W. Lash Miller, University of Toronto; secretary, Professor C. H. Herty, University of North Carolina, Chapel Hill, N. C.

*Section D—Mechanical Science and Engineering.*—Vice-president, Dr. J. A. Holmes, U. S. Reclamation Service; secretary, G. W. Bissell, Michigan Agricultural College, East Lansing, Mich.

*Section E—Geology and Geography.*—Vice-president, Professor James E. Todd, University of Kansas; secretary, Professor George F. Kay, University of Iowa.

*Section F—Zoology.*—Vice-president, Professor William A. Locy, Northwestern University; secretary, Professor Maurice A. Bigelow, Teachers College, Columbia University, New York City.

*Section G—Botany.*—Vice-president, Professor D. S. Johnson, The Johns Hopkins University;

secretary, Professor Henry G. Cowles, University of Chicago, Chicago, Ill.

*Section H—Anthropology and Psychology.*—Vice-president, Dr. J. Walter Fewkes, Bureau of American Ethnology; secretary, Professor George Grant MacCurdy, Yale University, New Haven, Conn.

*Section I—Social and Economic Science.*—Vice-president, John Hays Hammond, New York City; secretary, Seymour C. Loomis, 69 Church St., New Haven, Conn.

*Section K—Physiology and Experimental Medicine.*—Vice-president, Professor J. J. McCleod, Western Reserve University; secretary, Professor George T. Kemp, 8 West 25th St., Baltimore, Md.

*Section L—Education.*—Vice-president, Professor J. McKeen Cattell, Columbia University; secretary, Professor C. Riborg Mann, University of Chicago, Chicago, Ill.

*The Astronomical and Astrophysical Society of America.*—December 30–January 4. President, Professor E. C. Pickering, Harvard College Observatory; secretary, Professor Philip Fox, Dearborn Observatory, Evanston, Ill.

*The American Mathematical Society.*—December 31–January 2. President, Professor H. B. Fine, Princeton University; secretary, Professor F. N. Cole, 501 West 116th Street, New York City.

*The American Federation of Teachers of the Mathematical and the Natural Sciences.*—Between December 30–January 4. President, Professor C. R. Mann, University of Chicago; secretary, Eugene Randolph Smith, The Park School, Baltimore, Md.

*The American Physical Society.*—President, Professor W. F. Magie, Princeton University; secretary, Professor Ernest Merritt, Cornell University, Ithaca, N. Y.

*The American Society of Biological Chemists.*—December 30–January 1. President, Professor A. B. Macallum, University of Toronto; secretary, Professor A. N. Richards, University of Pennsylvania, Philadelphia, Pa.

*The American Physiological Society.*—December 30–January 1. President, Dr. S. J. Meltzer, Rockefeller Institute for Medical Research, New York City; secretary, Professor A. J. Carlson, University of Chicago, Chicago, Ill.

*The Society for Pharmacology and Experimental Therapeutics.*—December 30–31. President, Professor John J. Abel, The Johns Hopkins University; secretary, Dr. John Auer, Rockefeller Institute for Medical Research, New York City.

*The American Society of Naturalists.*—January 2. President, Professor E. G. Conklin, Princeton University; secretary, Professor A. L. Treadwell, Vassar College, Poughkeepsie, N. Y.

*The American Society of Zoologists.*—December 30–January 1. *Eastern Branch:* President, Dr. A. G. Meyer, Tortugas, Fla.; secretary, Professor J. H. Gerould, Dartmouth College. *Central Branch* (in charge of meeting): president, Professor H. B. Ward, University of Nebraska; secretary, Professor W. C. Curtis, University of Missouri, Columbia, Mo.

*The Association of American Anatomists.*—December 31–January 2. President, Professor Ross G. Harrison, Yale University; secretary, Professor G. Carl Huber, 1330 Hill Street, Ann Arbor, Mich.

*The Entomological Society of America.*—December 31–January 1. President, Professor Stephen A. Forbes, University of Illinois; secretary, Professor Alexander D. MacGillivray, 603 West Michigan Ave., Urbana, Ill.

*The American Association of Economic Entomologists.*—January 1–3. President, W. D. Hunter, Dallas, Tex.; secretary, A. F. Burgess, Melrose Highlands, Mass.

*The American Microscopical Society.*—December 31–January 1. President, Dr. F. D. Heald, Philadelphia; secretary, T. W. Galloway, Millikin University, Decatur, Ill.

*The Botanical Society of America.*—December 31–January 3. President, Professor L. R. Jones, University of Wisconsin; secretary, Dr. George T. Moore, Botanical Garden, St. Louis, Mo.

*Botanists of the Central States.*—Between December 30 and January 4. President, Professor T. H. Macbride, University of Iowa; secretary, Professor Henry C. Cowles, University of Chicago, Chicago, Ill.

*The American Phytopathological Society.*—December 31–January 3. President, Dr. G. P. Clinton, New Haven Agricultural Experiment Station; secretary, Dr. C. L. Shear, Department of Agriculture, Washington, D. C.

*The American Nature-Study Society.*—December 30–31. President, Professor Benjamin M. Davis, Miami University; secretary, Dr. Elliot R. Downing, University of Chicago, Chicago, Ill.

*The Association of Official Seed Analysts.*—January 2. President, Dr. E. H. Jenkins, New Haven,

Conn.; secretary, E. Brown, U. S. Department of Agriculture, Washington, D. C.

*American Association of Official Horticultural Inspectors.*—January 2–3. President, Dr. T. J. Headley, New Brunswick, N. J.; secretary, T. B. Symons, College Park, Md.

*The American Anthropological Association.*—December 30–January 3. President, Dr. J. Walter Fewkes, Bureau of Ethnology; secretary, Professor George Grant MacCurdy, Yale University, New Haven, Conn.

*The American Folk-Lore Society.*—January 1. President, John A. Lomax, University of Texas; secretary, Dr. Charles Peabody, Peabody Museum, Cambridge, Mass.

*The American Psychological Association.*—December 30–January 1. President, Professor Edward L. Thorndike, Columbia University; secretary, W. Van Dyke Bingham, Dartmouth College, Hanover, N. H.

*The Sigma Xi Convention.*—January 2. President, Professor Henry T. Eddy, University of Minnesota; secretary, Dr. Dayton C. Miller, Case School of Applied Science, Cleveland, Ohio.

*Gamma Alpha Graduate Scientific Fraternity.*—December 31. President, Professor William Crocker, University of Chicago; secretary, Professor H. E. Howe, Randolph-Macon College, Ashland, Va.

#### NEW HAVEN

*The Geological Society of America.*—December 28–31. President, Professor H. L. Fairchild, Rochester University; secretary, Dr. Edmund Otis Hovey, American Museum of Natural History, New York City.

*The Association of American Geographers.*—December 27–30. President, Professor Rollin D. Salisbury, University of Chicago; secretary, Professor Albert Perry Brigham, Hamilton, N. Y.

*The Paleontological Society.*—December 30–31. President, David White, U. S. Geological Survey; secretary, Dr. R. S. Bassler, U. S. National Museum, Washington, D. C.

#### BOSTON

*The American Economic Association.*—December 27–31. President, Professor Frank A. Fetter, Princeton University; secretary, Professor T. N. Carver, Harvard University, Cambridge, Mass.

*The American Statistical Association.*—December 27–30. President, Professor Walter F. Willcox, Cornell University; secretary, Carroll W. Doten, 491 Boylston Street, Boston, Mass.

*The American Sociological Society.*—December 27–31. President, Professor Albion W. Small, University of Chicago; secretary, Scott E. W. Bedford, University of Chicago, Chicago, Ill.

*The American Association for Labor Legislation.*—December 27–28. President, Professor Henry R. Seager, Columbia University; secretary, Dr. John B. Andrews, 131 East 23d St., New York City.

*The American Home Economics Association.*—December 30–31. President, Miss Isabel Bevier, University of Illinois; secretary, Benjamin R. Andrews, Teachers College, Columbia University, New York City.

#### NEW YORK CITY

*The Society of American Bacteriologists.*—December 31–January 2. President, Dr. Wm. H. Park, New York City; secretary, Charles E. Marshall, Amherst, Mass.

#### SOCIETIES AND ACADEMIES

##### PHILOSOPHICAL SOCIETY, UNIVERSITY OF VIRGINIA MATHEMATICAL AND SCIENTIFIC SECTION

THE second meeting of the session 1912–13 of the Mathematical and Scientific Section was held October 22, 8:00 P.M.

Professor F. P. Dunnington read a paper on "The Grinding of Cornmeal for Bread." Professor Dunnington also made a report of Professor H. A. Bernthsen's method of making ammonia.

Dr. Graham Edgar presented reviews of Professor Samuel Eyde's paper on "The Oxidation of Atmospheric Nitrogen and the Development of Resulting Industries in Norway," and of Professor W. M. Perkin's paper on "Synthetic Rubber."

WM. A. KEPNER,  
Secretary

##### UNIVERSITY OF VIRGINIA

##### THE ELISHA MITCHELL SCIENTIFIC SOCIETY

AT the 201st meeting of the society held November 12 in Chemistry Hall, University of North Carolina, the following papers were presented:

"The Physiological Action of Hamatin," by Dr. W. H. Brown.

"Forestry for Eastern North Carolina Lumbermen," by Mr. J. S. Holmes.

JAMES M. BELL,  
Recording Secretary

##### CHAPEL HILL, N. C.